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NASA Procedural Requirements

COMPLIANCE IS MANDATORY**NPR 7150.2A**Effective Date:
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Request Notification of Change

(NASA Only)

Subject: NASA Software Engineering Requirements**Responsible Office: Office of the Chief Engineer**[| TOC](#) | [Preface](#) | [Chapter1](#) | [Chapter2](#) | [Chapter3](#) | [Chapter4](#) | [Chapter5](#) |
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Preface

P.1 Purpose

Software engineering is a core capability and a key enabling technology for NASA's missions and supporting infrastructure. This NASA Procedural Requirements (NPR) supports the implementation of the NASA Policy Directive (NPD) 7120.4, NASA Engineering and Program/Project Management Policy. This NPR provides the minimal set of requirements established by the Agency for software acquisition, development, maintenance, retirement, operations, and management. This NPR is intended to support NASA programs and projects to accomplish their planned goals (e.g., mission success, safety, schedule, and budget) while satisfying their specified requirements. This NPR provides a set of software engineering requirements in generic terms to be applied throughout NASA and its contractor community. For this NPR, Software Engineering is defined as the application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software: that is, the application of engineering to software. For this NPR, Software is defined as the computer programs, procedures, scripts, rules, and associated documentation and data pertaining to the development and operation of a computer system. Software includes programs and data. This definition includes commercial-off-the-shelf (COTS) software, government-off-the-shelf (GOTS) software, modified-off-the-shelf (MOTS) software, reused software, auto generated code, embedded software, firmware, and open source software components.

P.2 Applicability and Scope

P.2.1 The requirements of this NPR cover software created or acquired by or for NASA. Requirements in this NPR apply to all of the Agency's investment areas containing software systems and subsystems. The applicability of the requirements in this NPR to specific systems and subsystems within the Agency's investment areas, programs, and projects is determined through the use of the NASA-wide definition of software classes in Appendix E, in conjunction with the Requirements Mapping Matrix in Appendix D. Some projects may contain multiple systems and subsystems having different software classes. Using the Requirements Mapping Matrix, the applicable requirements and their associated rigor are adapted according to the classification and safety-criticality of the software.

P.2.2 This NPR is applicable to NASA Headquarters and NASA Centers, including Component Facilities, Technical Support Centers, and Service Support Centers. This NPR applies to the Jet Propulsion Laboratory, other contractors, grant recipients, or parties to agreements only to the extent specified or referenced in the appropriate contracts, grants, or agreements.

Note: This statement alone is not sufficient to stipulate requirements for the contractor or grant recipient. NASA project managers stipulate which of the NPR requirements are applicable to the contracts, grants, or agreements. The contract, grant, or agreement must state the requirement(s) from the NPR that apply.

P.2.3 This NPR shall be applied to software development, maintenance, retirement, operations, management, acquisition, and assurance activities started after its initial date of issuance [SWE-001]. Note: This document is not retroactively applicable to software development, maintenance, operations, management, acquisition, and assurance activities started before September 27, 2004 (i.e., existing systems and subsystems containing software for Shuttle, International Space Station, Hubble, Chandra, etc.).

P.2.4 This NPR provides procedural requirements to the responsible NASA project managers and contracting officers for NASA contracts. The NPR is made applicable to contractors through contract clauses, specifications, or statements of work in conformance with the NASA Federal Acquisition Regulation (FAR) Supplement.

P.2.5 This NPR does not supersede more stringent requirements imposed by individual NASA organizations and other Federal Government agencies. Requirements in this NPR are identified by "shall" and a requirement number. Any material not identified by a "shall" in this NPR is informative in nature (e.g., notes, introductory text, etc.). The statements "must," "should," "are to be," "will," and "required" do not denote mandatory compliance.

P.3 Authority

- a. 40 U.S.C § 11101 et seq., Clinger-Cohen Act of 1996 (Pub. L. 104-106, Division E).
- b. 44 U.S.C. § 3501 et seq., Paperwork Reduction Act of 1995 (Public Law 104-13).
- c. OMB Circular A-130, Transmittal Memorandum #4, Management of Federal Information Resources (11/28/2000).

P.4 Applicable Documents

The latest versions of the following documents are to be applied:

NPD 1000.0, NASA Governance and Strategic Management Handbook.

NPD 1000.3, The NASA Organization.

NPD 1000.5, Policy for NASA Acquisition.

NPD 2091.1, Inventions Made by Government Employees.

NPD 2190.1, NASA Export Control Program.

NPD 2800.1, Managing Information Technology.

NPD 2810.1, NASA Information Security Policy.

NPD 7120.4, NASA Engineering and Program/Project Management Policy.

NPD 8700.1, NASA Policy for Safety and Mission Success.

NPD 9250.1, NASA's Property Plant and Equipment Policy.

NPR 2190.1, NASA Export Control Program.

NPR 2210.1, External Release of NASA Software.

NPR 2800.1, Managing Information Technology.

NPR 2810.1, Security of Information Technology.

NPR 7120.5, NASA Space Flight Program and Project Management Requirements.

NPR 7120.6, Lessons Learned Process.

NPR 7120.7, NASA Information Technology and Institutional Infrastructure Program and Project Management Requirements.

NPR 7120.8, NASA Research and Technology Program and Project Management Requirements.

NPR 7123.1, NASA Systems Engineering Processes and Requirements.

NPR 8000.4, Agency Risk Management Procedural Requirements.

NPR 8705.2, Human-Rating Requirements for Space Systems.

NPR 8715.3, NASA General Safety Program Requirements.

NPR 8735.2, Management of Government Quality Assurance Functions for NASA Contracts.

NPR 8800.15, Real Estate Management Program Implementation Manual.

NASA-STD-8739.8, NASA Software Assurance Standard.

NASA-STD-8719.13, Software Safety Standard.

See Appendix C for a complete list of reference documents.

P.5 Measurement/Verification

Compliance with the requirements contained in this NPR is documented in accordance with paragraph 6.3.2. Engineering Technical Authorities keep records of compliance matrices, waivers, and deviations with respect to this NPR in accordance with paragraph 6.3.7. Additionally, the NASA Headquarters Office of the Chief Engineer authorizes periodic appraisals against select requirements in this NPR in accordance with paragraph 6.3.8.

P.6 Cancellation

NPR 7150.2, NASA Software Engineering Requirements, dated September 27, 2004.

NASA Chief Engineer

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